

Abstract

A rare-earth Y-zeolite-containing catalyst for cracking hydrocarbons and a method for preparing the same

The invention discloses a rare-earth Y-zeolite-containing catalyst for cracking hydrocarbons and a method for preparing the same. The catalyst is characterized in that the rare-earth content in crystal lattice of the rare-earth Y-zeolite, calculated in RE_2O_3 , is from 4 to 15% by weight, the original unit cell size is from 2.440nm to 2.465nm and the equilibrium unit cell size after 100% steam-aging treatment at 800°C for 17 hours is larger than 2.435nm. The catalyst is obtained in the following steps: the rare-earth Y-zeolite is dried first till its water content less than 10% by weight, then in a weight ratio of $SiCl_4$: Y-zeolite= 0.1~0.9: 1, reacts with $SiCl_4$ gas carried by dry air, further is purged by dry air and washed by decationized water to remove the soluble by-products; the resulted rare-earth Y-zeolite is mixed with a binder and a clay, pulped and formed by spray drying. The zeolite content of the catalyst disclosed in present invention decreases 5~25% by weight compared to the catalyst prepared in prior art for cracking heavy oil and decreasing olefin content. The catalyst is characterized with good cracking activity, high hydrothermal stability, and high conversion of heavy oil as well as excellent selectivity of gasoline, dry gas and coke; moreover, the olefin content in the produced gasoline decreases effectively.